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Title: **Safety Binding**

Abstract: A safety binding is shown, especially for downhill travel of suitable snow gliders or the like. A glider board (1) is involved with a lower part (2) mounted on it and an upper part (4) separable therefrom and mounted on a shoe (3), with the lower and upper parts being joined by a plug-in connection.

The lower and upper part consist of at least one replaceable plate (6, 7, 8, 13, 14), in other words provided with suitable fastening means (11, 12).

The essence of the connection consists of knobs (6, 9) located opposite one another and capable of being inserted into one another, or of knobs and matching recesses (29) or of knobs and variously shaped lattice bodies (27).

Depending on the individual requirements of the individual snow glider rider, the friction of the plug-in connection and hence of the freedom of movement of the rider can be varied. This is accomplished by certain mechanical designs of the plug-in mechanism.

Specification

The invention relates to a safety binding, especially for downhill travel of suitable snow gliders or the like, consisting of a glider board, with a lower part mounted thereon and an upper part separable therefrom and attached to a shoe.

In a safety binding of the type described above that has been known for a long time (DE-OS 29 22 027), an elastic belt to receive the forward part of the foot is secured completely on the standing surface of the glider board which is fitted with anti-slip pins, in the forward area by two crossed belts. The rear part of the foot is also freely movable. A safety binding of another kind is known from DE-OS 29 00 923 which is located in the form of a turntable in the rear area of the glider board to hold the rear part of the foot while the front part of the foot is held only by a slip-resistant coating on the glider board. Both embodiments, however, have the disadvantage that one foot is secured almost completely to one point on the glider board, apart from a possible slight rotatability, while the other foot is freely movable. Consequently, such glider boards are relatively simple to handle when pressure is applied to the glider board or its edges. On the other hand, when this pressure is released, the freely movable foot lifts off the glider board. It is easy to fall.

This problem is remedied in the designs according to DE-OS 29 36 368 and DE-OS 33 23 813, in each of which the feet are secured by two belts connected rigidly and non-releasably to the glider board. In addition, an additional safety binding is known from DE-OS 39 10 468 that consists of two individual binding parts mounted on the glider board transversely to its lengthwise axis. Regardless of the fact that in these embodiments the glider board, because of high friction, is subjected relatively accurately and deliberately to pressure or can be relieved of pressure depending on the travel situation at the moment, it has been found to be extraordinarily disadvantageous in practice that the feet are in contact only at one very specific location through the safety bindings in contact with the glider

board and on the other hand are aligned exclusively in a single, predetermined direction. Such a sharply delimited mobility or freedom of movement of the feet, however, also produces a much greater danger of falling, and thus poses a greater risk of injury to the snow glider rider.

Hence, the goal of the invention is a safety binding of the type recited at the outset which, in addition to high friction, simultaneously offers a greater mobility of both feet of the snow glider rider and thus simultaneously permits a considerable adaptation to individual requirements of the snow glider rider without high expense of construction.

To achieve this goal, provision is made according to the invention in a safety binding of the type described at the outset that the lower and upper parts are connected with one another by a plug-in connection.

As a result of the arrangement according to the invention, high friction is possible between the feet of the snow glider rider and the glider board on the one hand, without limiting the mobility or freedom of movement of the feet on the other. With such a plug-in connection, high cohesion can be produced between the lower part of the glider board and the upper part of the shoe, namely the foot. The plug-in connection can also be released easily and quickly even during travel depending on the traveling position at the moment, weight displacement of the snow glider rider, or the like. Then the plug-in connection can be renewed again easily and quickly at another location on the glider board.

As a result of the design of the safety binding, namely the plug-in connection between the lower and upper parts, the friction can be increased even further while keeping the mobility or freedom of movement of the feet constant.

In addition, provision is made according to the invention that the lower and upper parts each consist of at least one plate which are designed so that they can be

fitted into one another. As a result, the lower and/or upper part can be made both one-piece and multi-piece. This opens up further possible variations for the snow glider rider regarding friction and mobility of the feet to meet his individual requirements, riding skill, snow conditions, etc.

It is also within the framework of the invention to provide the plate(s) of the lower and upper parts with knobs that can grip one another mutually. In an alternative design, the plate(s) of the upper part are provided with knobs that can be inserted into matching recesses in the plates of the lower part. In addition, the invention undergoes further shaping by the fact that the plate(s) of the lower part are fitted with knobs that can be inserted into matching recesses in the upper part. All of these design solutions permit high friction between the feet and the glider board without mobility of the feet being reduced. In addition, there are many possible combinations for the snow glider rider since the individual solutions can be interchanged. Thus, for example, the plate(s) of the upper part provided with knobs are suitable for plug-in connection with one or more plates of the lower part which have neither knobs nor recesses.

According to another feature of the invention, the knobs or recesses of the respective plates are arranged at regular intervals with respect to one another. This results in extremely high friction since the shapewise or forcewise plug-in connection is made by a plurality of knobs or recesses that can be engage one another.

It has proven to be extremely advantageous in this connection to place the knobs or recesses on the plate(s) in any form, since high mobility or freedom of movement of the feet on the glider board is obtained at the same time as a result.

In particular, the lattice shape is made square so that certain lattice lines run on the lengthwise axis of the glider board while the other lattice lines run transversely to the lengthwise axis. This has the advantage that the feet

arranged transversely to the lengthwise axis of the glider board come in contact with the glider board at other points on the board transversely to its lengthwise axis, but there is also a possibility of moving the feet in the direction of or opposite the direction of a bent shovel, in other words in the lengthwise direction of the glider board as well as toward the right or left side of the glider board.

In order for the basic foot position on the glider board to be varied, in other words the feet are not aligned exclusively on the lengthwise axis of the glider board or transversely thereto, according to the invention – alternatively or in addition – provision is made that one set of lattice lines assumes a certain angle to the lengthwise axis of the glider board and the other lattice lines are perpendicular to the first set of lattice lines. Thus, it is preferable within the scope of the invention that the angle is 15° or a multiple thereof, especially approximately 30° or 45°. It is therefore possible for example to equip a glider board with two plates of approximately the same size located one behind the other and fitted with knobs. The rear plate then has a square lattice shape that allows a basic foot position in which the rear foot is aligned on or transversely to the lengthwise axis of the glider board. In the forward plate, on the other hand, a square lattice shape is produced whose lattice lines assume an angle of 45° for example to the lengthwise axis of the glider board. This allows a basic foot position of the forward part of the foot in which the latter is always aligned on the forward plate at 45° to the lengthwise axis, provided the knobs of the upper part of the forward part of the shoe do not assume a modified position relative to one another. These possible variations also exist for embodiments with recesses. In addition, different basic foot positions can be achieved by varying the arrangement of the knobs or recesses on the upper parts of the shoes. Finally, the possible combinations can be shaped in different ways to correspond to the individual requirements and riding skill.

Thus, in another embodiment of the invention, instead of a square lattice shape, a triangular or even a rectangular shape is provided for the knobs and recesses to be provided on the plate or plates.

According to the invention, various lattice shapes can also be made on different plates on the lower and/or upper parts provided the corresponding upper or lower part is adjusted to the respective lattice shape.

For the case that the snow glider rider, because of his riding skill or because of snow conditions requires lower friction with the glider board, or a much higher mobility of his feet, as provided later on according to the invention, the knobs of the respective plate(s) must be arranged at irregular intervals from one another so that they can be inserted between the knobs or into the recesses of the plates of the associated lower or upper parts.

In another embodiment of the invention, the plates of the lower part are releasably connected with the glider board. Conversely, according to the invention, the plates of the upper part can be fastened interchangeably to the shoe. This has the advantage that the glider board and the shoes can be adjusted by replaceable plates to any possible situation or nearly any individual requirements of the snow glider rider, especially as the safety binding remains functional even after the adjustments have been made. In addition, such a kit system makes both the assembly and cost much lower for the snow glider rider.

For further simplification of the release and fastening process of the plate(s) on the glider board or on a shoe, fastening means such as wing nuts etc. are provided according to the invention. For this purpose, special clamping elements are also suitable so that the upper part of the safety binding according to the invention can be readily mounted particularly on conventional ski boots or even normal footwear. The need for special shoes does not even exist in this case.

In addition, it falls within the framework of the invention to make the knobs differently in order in this fashion to increase the influence on friction and mobility. Thus, the knobs can be conical, cylindrical, or profiled in the shape of a pine tree or an arrow. For high friction, the profiled knobs are very suitable while cylindrical or conical knobs are better for high mobility.

Combination and adaptation possibilities are also provided for the snow glider rider by the fact that the knobs and recesses in the plate(s) of the lower part and upper part are made of the same or different, especially ductile materials. Therefore, harder plastics or the like are suitable for high friction while Figure 1 is a side view of one embodiment of a safety binding with a shoe and partially broken away glider board in engagement;

Figure 2 is an exploded side view of an embodiment of a safety binding with a shoe and a glider board for high mobility while softer plastics, rubber, etc. are preferred.

Finally, it falls within the framework of the invention to heat the knobs and/or walls of the recesses of the plate(s) of the lower end or upper part to prevent them sticking to the snow. This can be accomplished by heating coils being provided in the knobs and/or walls of the recesses which are supplied with current by batteries, storage batteries, or the like located on the glider board and/or on the shoe.

Additional features, advantages, and details of the invention follow from the description below of a few preferred embodiments of the invention as well as the drawing.

Figure 1 is a side view of an embodiment of a safety binding with a shoe and a glider board partially broken away;

Figure 2 is pulled-apart side view of an embodiment of a safety binding with a shoe and partially broken away glider board before assembly.

Figure 3 is a perspective schematic and pulled-apart view of a glider board in a reduced representation prior to assembly;

Figures 4 and 5 provide a schematic top view of one embodiment of a glider board with two plates;

Figure 6 is a schematic view of another embodiment of a glider board with two plates;

Figure 7 is a portion of an embodiment of a lattice shape for knobs or recesses;

Figure 8 is a portion of another embodiment of a lattice shape for knobs or recesses;

Figures 9-11 are bottom views of various embodiments of plates of the upper part on the shoe according to the invention;

Figures 12-17 are side views of various embodiments of knobs according to the invention; and

Figure 18 is a schematic, partially broken away side view of another embodiment of a glider board according to the invention.

The safety binding shown in Figure 1 consists of a glider board 1 with a lower part 2 mounted on it and an upper part 4 that can be separated from lower part 2 of glider board 1 and is mounted on a shoe 3. Lower part 2 is made as a one-piece plate 5 on which knobs 6 are mounted regular distances apart. Upper part 4 has two individual plates 7, 8 located opposite on which knobs 9 are also

mounted at regular intervals apart. The respective knobs 6 and 9 of plates 5 and 7, 8 of lower part 2 and upper part 4 grip one another mutually and thus constitute a dimensional and/or forcewise plug-in connection. Shoe 3 is thus releasably connected with glider board 1.

Figure 2 shows the safety binding in an unmounted state. Accordingly, plates 7, 8 provided with knobs 9 are mounted on the underside 10 of shoe 3 by fastening means 11, such as wing nuts for example or by clamping elements, not shown. Similarly, plate 5 that carries knobs 6 is mounted on glider board 1 by wing nuts to mounting means 12.

Two plates 13, 14, namely one rear and one front type, can be mounted on glider board 1 in Figure 3. Plates 13, 14 are provided with knobs or recesses, not shown, as well as a plurality of bores 17 uniformly distributed around the outer edge 15, 16. The wing nuts can be passed through these bores 17 as fastening means 12 and can be screwed into bores 18 fitted with threads and mounted accordingly on glider board 1.

Figure 4 shows a schematic view of a snow glider in a top view. A glider board 1 with a shovel 19 is provided with a rear and a front plate 13, 14 connected by fastening means 12 with glider board 1. On the two plates 13, 14 knobs 6 are located in lattice form 27 with lattice form 27 being made square in such fashion that one has lattice lines 20 running on a lengthwise axis 21 of glider board 1 while the other lattice lines 22 run diagonally to lengthwise axis 21. As a result, a basic foot position is possible in which the front foot 24 is aligned with lengthwise axis 21 and the rear foot 23 is aligned transversely to lengthwise axis 21. Naturally, it is also quite possible for example with this type of lattice that the front foot 24 is aligned transversely to the lengthwise axis 21 at a different point on plate 14 and/or rear foot 23 is aligned on lengthwise axis 23 on plate 13 as shown in Figure 5. It is also possible for feet 23, 24 to move as desired, in other

words both on and transversely to lengthwise axis 21 of glider board 1 and also to the right or left side edges 25, 26 of glider board 1.

In Figure 6, another embodiment of a snow glider is shown schematically in a top view. Glider board 1 with its shovel 19 is connected with a rear and a front plate 13, 14 by fastening means 12. Rear plate 13 also has a square lattice shape 27 with lattice lines 20, 22 running on or transversely to lengthwise axis 21. On the other hand, in front plate 14 there is a square lattice shape 27 whose lattice lines 20, 22 assume an angle of 45° to the lengthwise axis 21 of glider board 1. This allows a basic position of front foot 24 in which the latter is always aligned at 45° to lengthwise axis 21 on front plate 14.

Figures 7 and 8 show a section of a lattice shape 27 of knobs or recesses provided for plates 5, 7, 8 as well as the lower part 2 and upper part 4. The knobs, not shown here, are arranged regularly and irregularly at the intersections 28 of lattice lines 20, 22. On the other hand, if recesses 29 are being discussed, located on lower part 2 and/or on the upper part, lattice lines 20, 22 constitute the walls 30 of recesses 29. While in Figure 7 lattice shape 27 is made square, it is triangular in Figure 8.

In Figures 9-11, lower sides 10 of a shoe 3 are shown schematically. Upper part 4 is shown in Figure 9 as a one-piece plate 5 that is connected by fastening means 11 with underside 10 of shoe 3. On plate 5, knobs 6 are distributed over the entire plate 5 at regular distances apart.

Upper part 4 according to Figure 10 is likewise provided as a one-piece plate 5 secured by fastening means 11 to shoe 3 with a total of three knobs 6 irregularly arranged on plate 5.

By contrast to this, upper part 4 in Figure 11 is fitted with two individual plates 5 that are releasably connected by fastening elements 11 with shoe 3. Plate 5 has four knobs 9 located regularly with respect to one another.

In addition, knobs 6, 9 of different shapes are shown in Figures 12 to 17. Accordingly, Figure 13 can be made conical or conically tapered. To increase friction, shaped knobs 6, 9 as well as knobs 6, 9 in Figures 14 and 15 provided with endwise thickenings or widenings like knobs 6, 9 in Figures 14 and 15. The widening 31, 32 that is spherical and arrow- or cone-shaped at the end of cylindrically mounted knobs 6, 9 is provided through which the force and/or shapewise connection of the plug-in connection is additionally increased. Finally, knobs 6, 9 in Figures 16 and 17 are shaped like pine trees which thus can be inserted or can engage one another like the teeth of a saw or can also be inserted or engage the recesses. While knobs 6, 9 in Figure 16 have profiles with parallel walls, the knobs in Figure 17 taper conically.

In Figure 18, another embodiment of a glider board 1 is shown with a plate 5 that is spaced a short distance from the glider board by spacers 31 parallel thereto. Plate 5 of lower part 2 is made lattice-shaped and has regularly spaced recesses 29 corresponding to the selected lattice form 27 into which knobs 6 of upper part 2 of shoe 3 can be inserted. By spacing plate 5 from glider board 1, recesses 29 can be prevented from becoming clogged with snow since the snow will fall through the recesses 29 and is automatically removed by the side edges 25, 26 of glider board 1.

The invention is not limited to the embodiments shown. For example, it is possible to provide on glider board 1 more than one or two plates 5, 13, 14 of lower part 2 with for example a different lattice shape 27 or even a different arrangement of the same lattice shapes 27 to the lengthwise axis 21 of glider board 1. The same is true of upper part 4 to be mounted on shoe 3. In addition, the individual plates 5, 7, 8, 13, 14 can consist of different materials or can be

provided with differently shaped knobs 6, 9 or recesses 29. Even the arrangement of knobs 9 on the upper part, as required, can be varied in any desired fashion. Thus, it is possible to have only a single knob 9 mounted on the top part, or even two of them, without a specific geometric relationship to one another.

Moreover, it is no problem to equip plates 7, 8 of upper part 4 with clamping elements similar to those provided on sliding, skiing, or even roller skates so that even ski boots or normal footwear can be used to operate the snow glider according to the invention.

It is also a simple matter to mount a receiving device on glider board 1 or on shoe 3, for example on glider board 1 in the vicinity of shovel 19 into which a battery or a storage battery is inserted to supply the heating coils embedded in knobs 6, 9 or walls 30 of recesses 29 with current so that they cannot be blocked by the snow during travel.

Finally, the safety binding according to the invention can also be combined with conventional types of bindings so that the forward part of the foot can be secured firmly in a conventional binding, the rear part of the foot can be secured by a plug-in connection to the glider board. If it is taken into account that the front part of the foot is relatively sharply limited in its freedom of movement, the rear part of the foot would be movable at the same time and would be secured to glider board 1 to meet modern safety needs.

All of the features disclosed in the application documents are claimed as essential to the invention to the extent that they are novel individually or in combination relative to the prior art.

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Int. Cl.5: A 63 C 9/08
Offenlegungstag: 9. Januar 1992

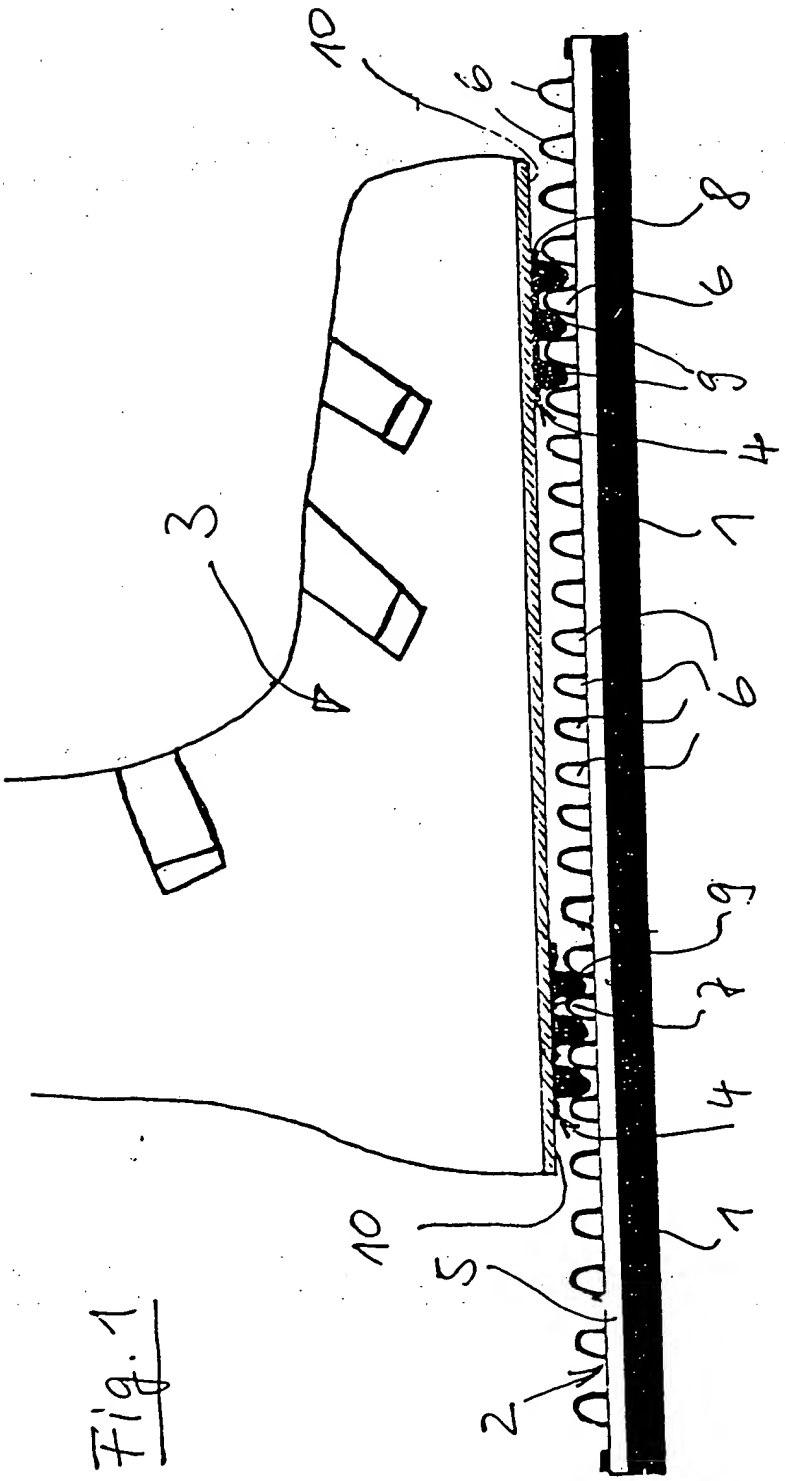

Fig. 1

Nummer: DE 40 20 873 A1
Int. Cl.[5]: A 63 C 9/08
Offenlegungstag: 9. Januar 1992

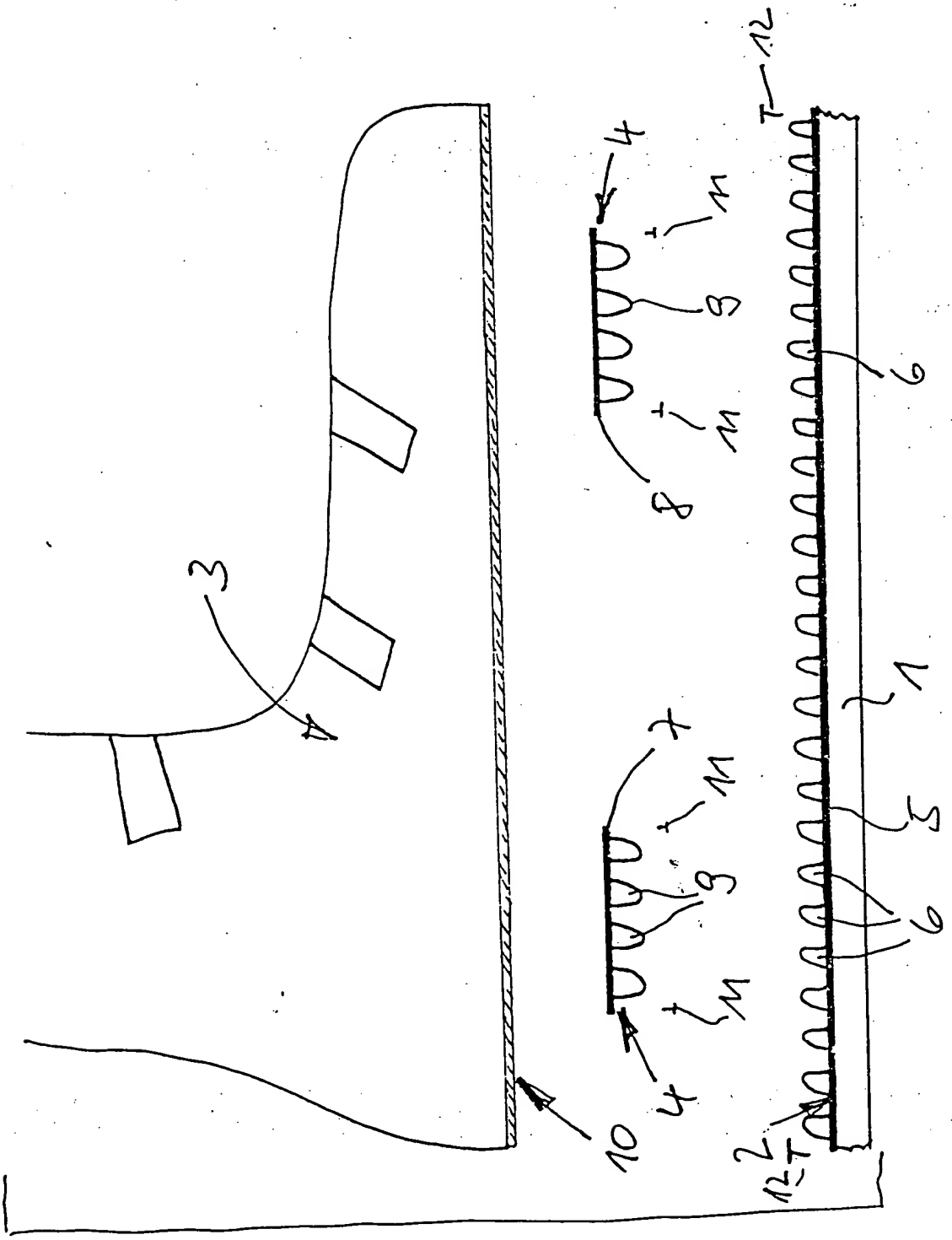

Fig. 2

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DE 40 20 873 A1
A 63 C 9/08
9. Januar 1992

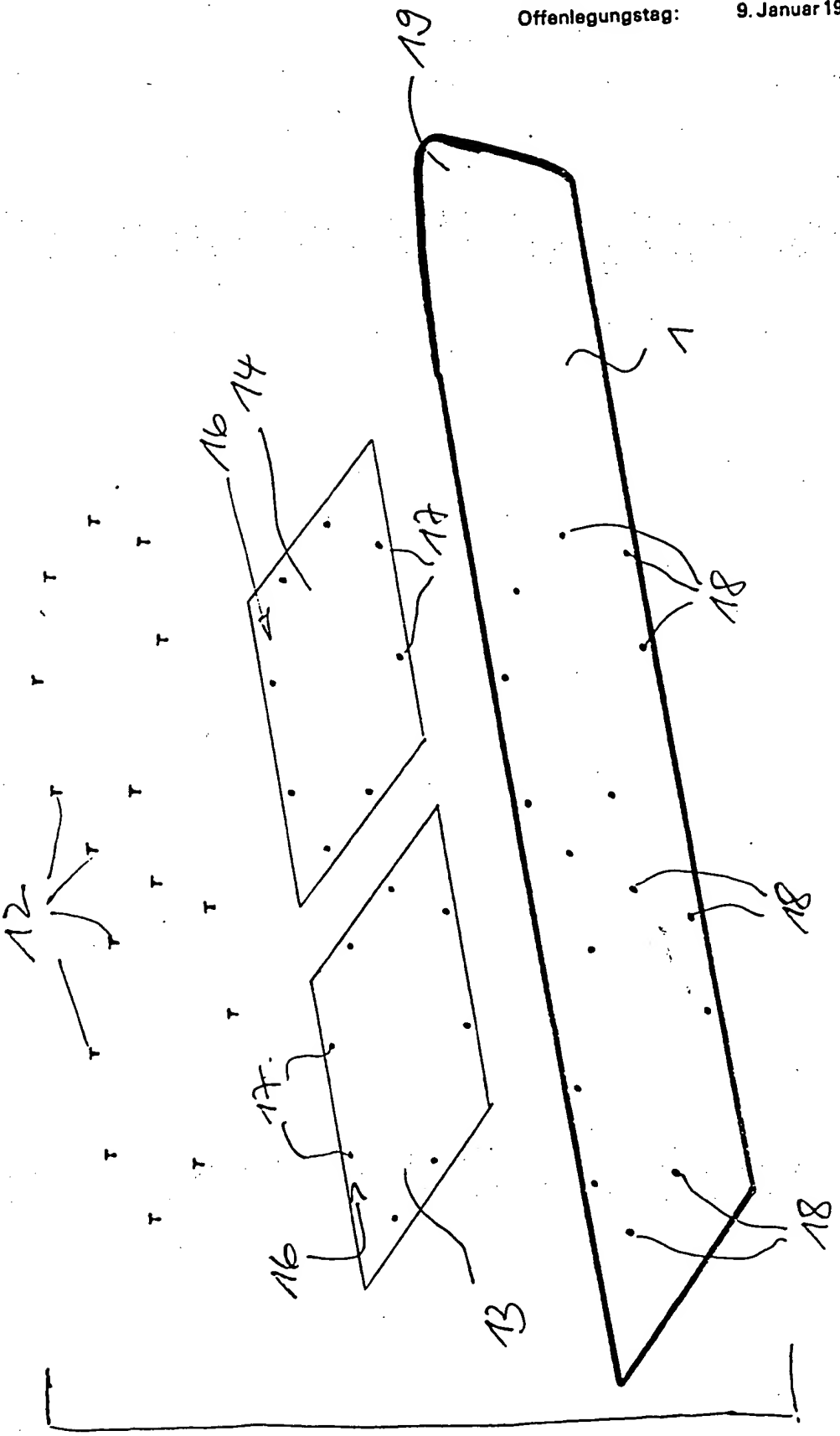


Fig. 3

Nummer: DE 40 20 873 A1
Int. Cl.5: A 63 C 9/08
Offenlegungstag: 9. Januar 1992

Fig. 4

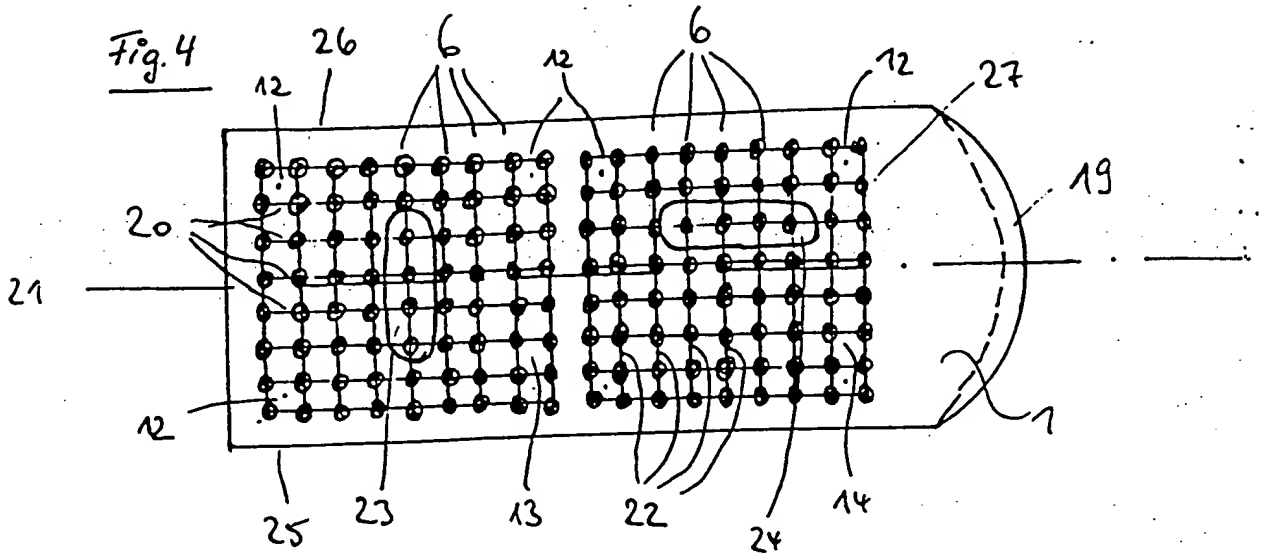


Fig. 5

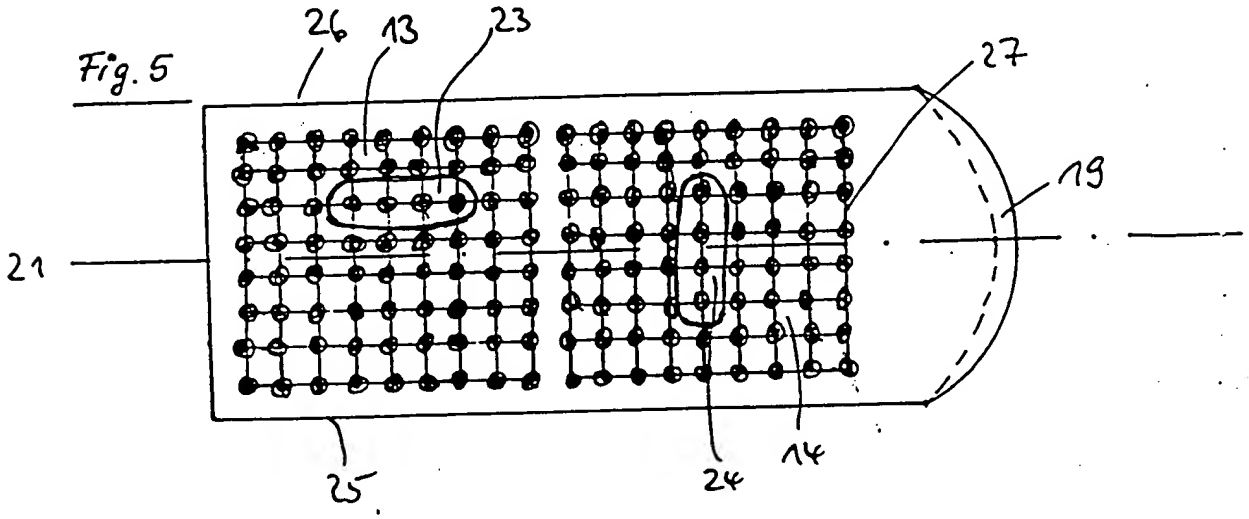
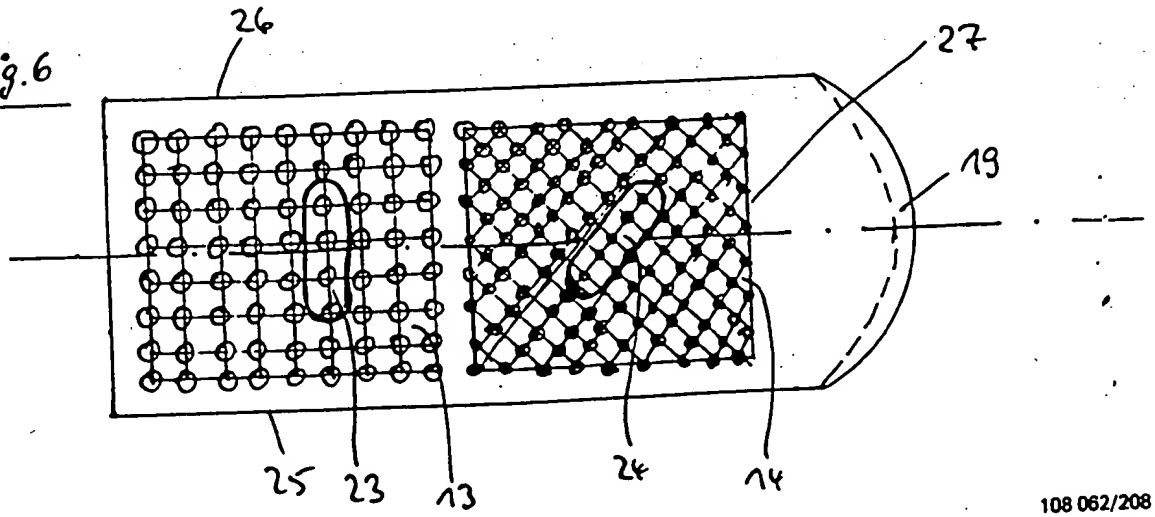


Fig. 6



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Offenlegungstag:

DE 40 20 873 A1
A 63 C 9/08
9. Januar 1992

Fig. 7

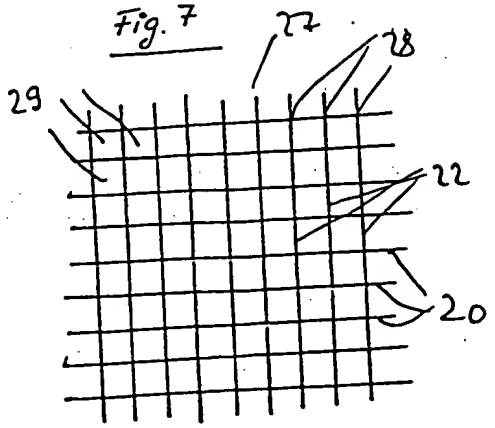


Fig. 8

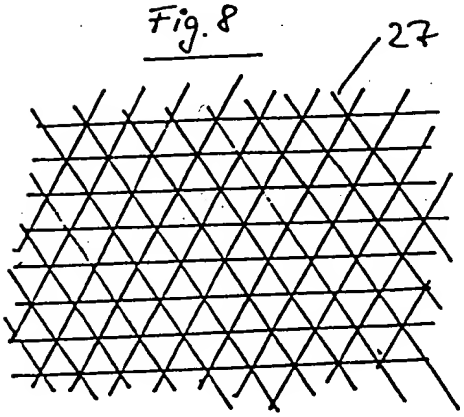


Fig. 9

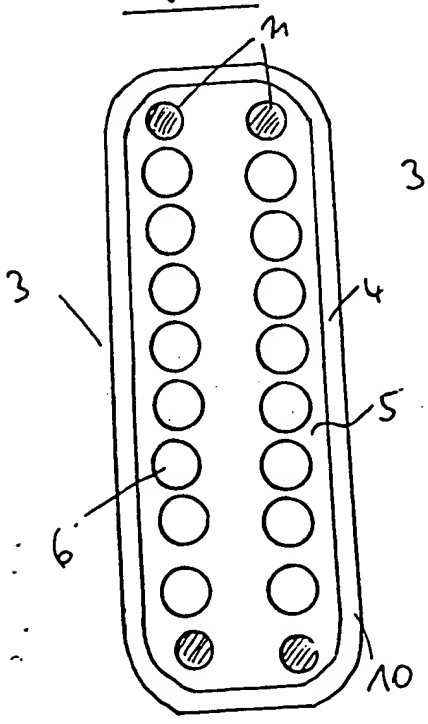


Fig. 10

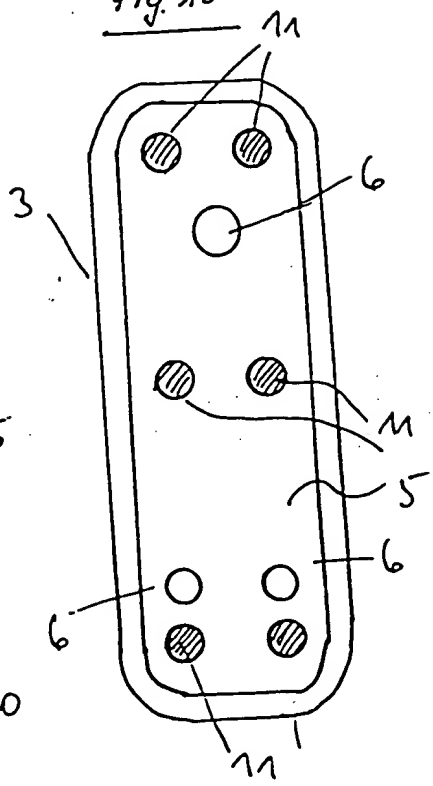
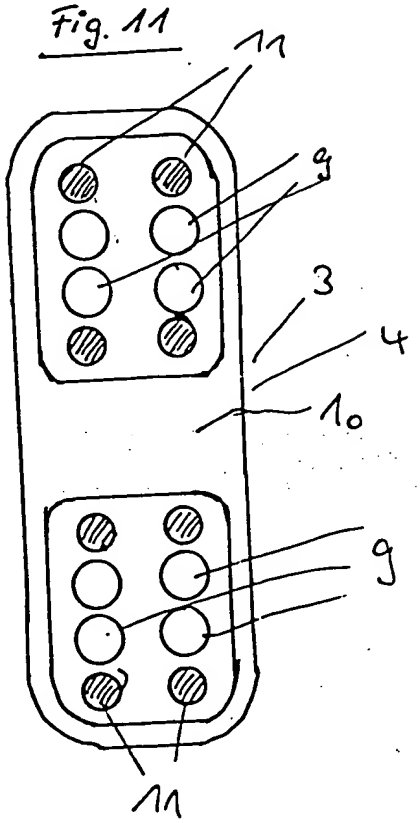


Fig. 11



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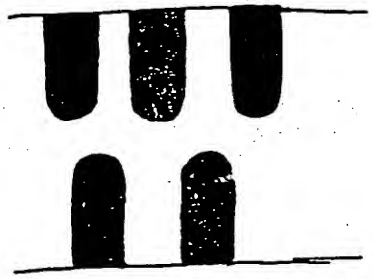

Fig. 12

Fig. 13

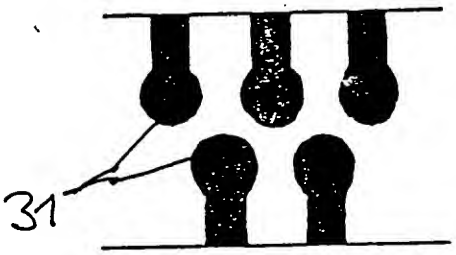

Fig. 14

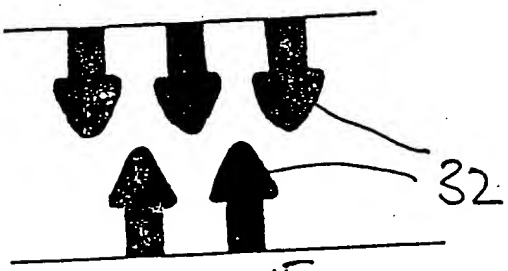

Fig. 15

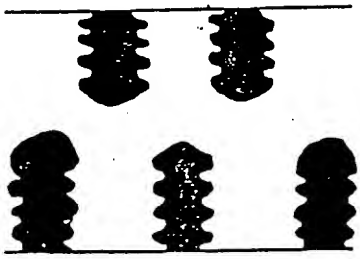

Fig. 16

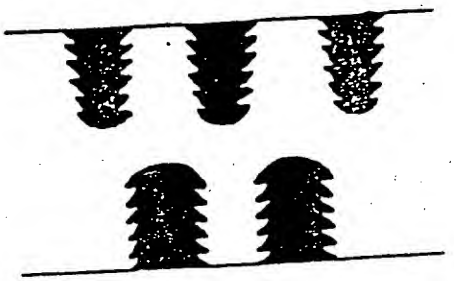

Fig. 17

Num
Int. Cl.[5]:
Offenlegungstag:

DE 40 20 873 A1
A 63 C 9/08
9. Januar 1992

Fig. 18